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ABSTRACT

Compiled in this teacher's guide are suggestions for a unit approach to the study of water in the primary grades. Designed to be utilized with related student documents, it contains the text or script of these works: THE ABC's OF WATER, SE 016 491 and A TRIP TO THE WATER PLANT, SE 016 488. Also, it includes unit objectives; teaching procedures; a poem about the water cycle--"Little Johnny Raindrop"; a water cycle wheel; a basic math book covering numbers one to four and cup, pint, and quart measurement; and the script for the filmstrip "Our Water Supply." Appended sections to this guide are (1) "Teacher Guidelines for the Study of Water," pertinent information with which teachers should be familiar before starting a water study, and (2) "Water Study Activities for Primary Youngsters, A Teacher's Handbook," over 100 activities for teaching facts and concepts about water. It interrelates activities through an interdisciplinary approach and is based on the student booklet, THE ABC's OF WATER, SE 016 491. (BL)

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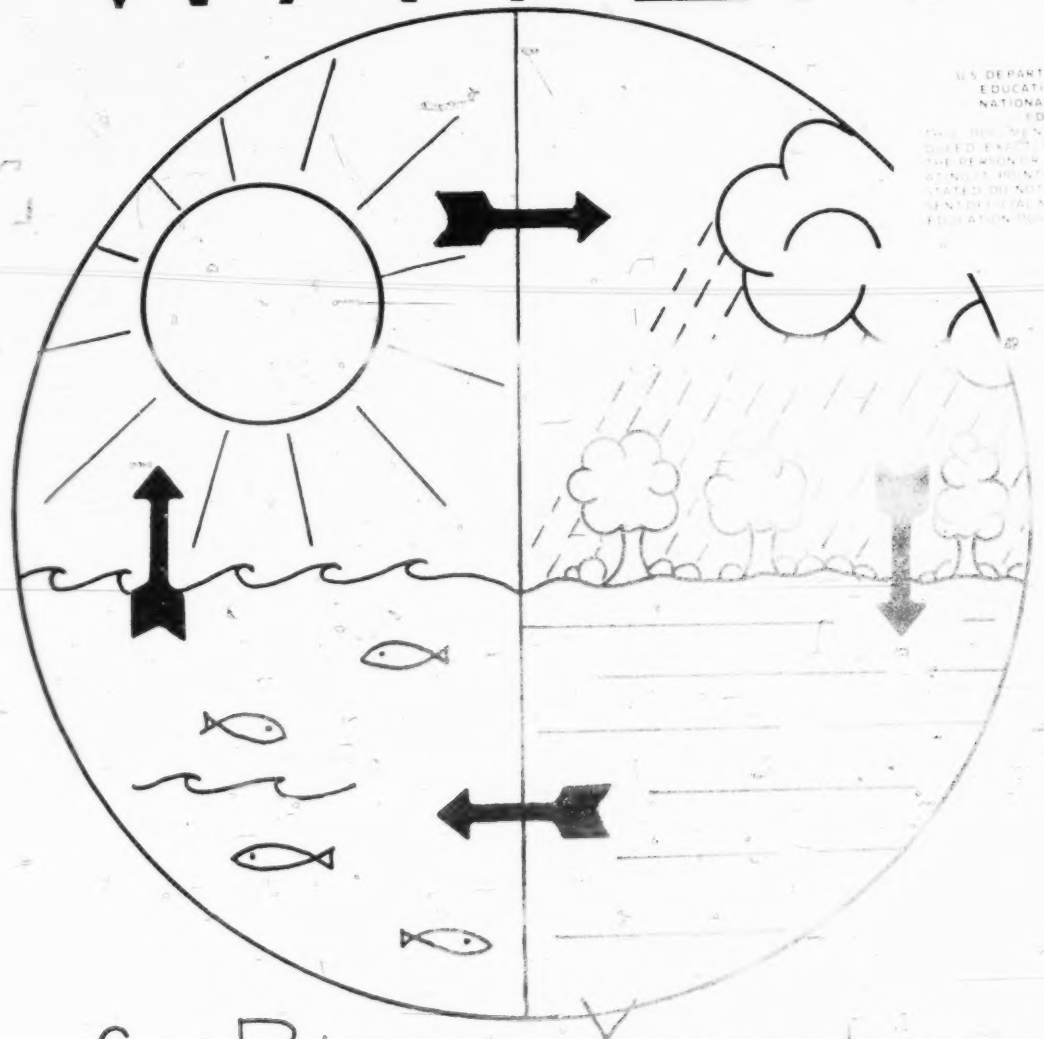
A Teacher's Guide to the Study of

WATER



U.S. DEPARTMENT OF HEALTH
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

for Primary Youngsters

INTERDISCIPLINARY ENVIRONMENTAL EDUCATION
AN ESEA TITLE III PROJECT
Based at Nova High School
Broward County Schools, Florida
1972

SE 016 490

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An ESEA Title III Project

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INTERDISCIPLINARY ENVIRONMENTAL EDUCATION

An ESEA Title III Project

A TEACHER'S GUIDE TO THE STUDY OF WATER

For Primary Youngsters

OBJECTIVES

A. Upon completion of the primary water unit, pupils should be able to answer at least seven of the following ten questions correctly. Questions should be administered to pupils individually and orally. Reasonable answers, other than those suggested, should be accepted.

1. What would happen to men, animals, and plants if there were no more water on earth? (They would die.)

2. We have a great deal of water in our bodies. What valuable liquid in our bodies is mostly water? (Blood.)

3. The face of our earth is made of both land and water. Which of these makes up the larger part? (Water.)

4. What do we call the largest bodies of water on the earth? (Oceans.)

5. (Show a globe to the pupil.) Point out an ocean on this globe.

6. Why can't we generally use ocean water for drinking? (Too salty.)

7. (Show cup, quart, and gallon containers.) Tell me the names of at least two of these measuring containers.

8. Why isn't it wise to drink water directly from a canal or lake? (Might be polluted, might make you sick, might have germs, etc.)

9. Tell me one cause of water pollution. (Sewer dumping into open water, using detergents, throwing trash in water, putting chemicals down drains, etc.)

10. Tell me one thing people can do to help our area have enough clean, healthful water. (Keep waterways clean, conserve water in the home, don't dump harmful substances down drain or toilet, etc.)

B. Upon completion of the primary water unit, the pupils should be able to draw four pictures, each showing a different way in which man uses water.

C. Upon completion of the primary water unit, including at least ten days of working with the water cycle wheels, the pupils should be able to answer or perform at least four of the following questions or tasks, using their water wheels. Reasonable answers, other than those suggested, should be accepted.

1. What is a cycle? (Something that happens over and over again.)

2. Point out on the water wheel the thing that rain comes from. (Cloud.)

3. Tell me one thing that might happen to water after it sinks into the ground. (It goes into the sea or other body of water, is used by plants, evaporates, is pumped up and used by people.)

4. On the water wheel show the rain drops returning to the sky and tell me what water really looks like when it goes up into the sky. (It is invisible.)

5. When water rises up into the sky in invisible form, what do we call it? (Water vapor.)

6. Again show me on the water wheel water rising to the sky and tell me what makes the water of the ocean turn into vapor? (Heat or sun.)

7. What causes water vapor to turn into clouds and then to rain? (Drops gather together; the vapor cools.)

8. Why do we say there is a water cycle? (Because water keeps coming to earth, going back up into the sky, and then coming to earth again.)

MATERIALS

(Produced for this study by IEE)

LITTLE JOHNNY RAINDROP - a poetry book teaching the water cycle. *

WATER CYCLE WHEELS - a color, cut-out, and assemble wheel depicting the water cycle. *

THE A B C's OF WATER - an alphabet book in which each letter represents a word dealing in some way with water. *

LET'S MEASURE WATER - a very basic math book covering numerals 1 to 4 and cup, pint, and quart measurement. *

A TRIP TO THE WATER PLANT - a simply written, clearly illustrated book explaining how water is obtained and purified in Broward County. Good preparation for a field trip to the water treatment plant. *

OUR WATER SUPPLY - a filmstrip and record showing how water is obtained and purified in Broward County. Good preparation for a field trip to the water treatment plant. *

WATER STUDY ACTIVITIES FOR PRIMARY YOUNGSTERS - over 100 suggested activities for teaching facts and concepts about water. Based on the IEE booklet The A B C's of WATER. Interrelates activities with all of the traditional disciplines. (Included in this guide.)

GUIDELINES FOR THE STUDY OF WATER - pertinent information with which teachers should be familiar before starting a water study. Based on Part I of the IEE Guidelines for Curriculum Development - Environmental Education K-12: Concepts, Ideas, Objectives and Principles. (Included in this guide.)

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*In the event these materials are unavailable, patterns and texts for duplication have been provided in this guide.

PROCEDURES

1. Become acquainted with the IEE water study materials.

2. Use Little Johnny Raindrop as the basis of the study. Read it frequently. Have the children dramatize it, make puppets, recite it, learn it, etc.

3. Use The A B C's of Water and Water Study Activities for Primary Youngsters as a guide for the entire study.

4. Have the children color, cut, and assemble their own individual water cycle wheels. Have them demonstrate and explain the water cycle frequently, using these wheels. Construct a larger wheel for display in the classroom.

5. Incorporate related information, materials, and activities from your texts, library books and media, county films, etc.

6. Use all of these materials as the central theme for your entire learning program. (If this is impossible, however, the materials may be used as a separate unit.)

RECOMMENDED COUNTY FILMS:

"Water, Water Everywhere". 551.4-611 (11 min.)
Children learn of the water cycle through Jimmy's observations. Excellent film for young children.

"Water - A First Film". 511.4-1704 (11 min., color)
Artistic treatment of the subject, showing various values of water and how to prevent misuse. Excellent for beginners.

"Water In The Air". 551.4-0610 (11 min.)
Two boys on a farm learn about the water cycle by observation and experimentation. Fairly good.

"Visit To The Waterworks". 628.1-1008 (11 min.)
Children are shown through the waterworks. The difference between treated and untreated water is explained. Good film to show before a field trip to the water plant, but connected with reservoir system rather than underground water such as we have in Broward County.

"The Forest Guards Our Water Supply". 634.9-2134 (11 min. color)
Explains that the way to insure a good supply of clean water is to protect the forested land on which the rains fall.

"I Like Water". 333.9-2647 (8 min. color)
Verse narration which stimulates appreciation of water. Also motivates activities in art, language arts and science.

"One Rainy Day: Background For Reading and Expression". 551.5-631 (11 min. color)
On a rainy day children in class listen to a story which explains how a storm begins with winds, clouds, thunder, and lightning - what the rain does for soil, plants, cities, and people. Suddenly the rain stops and a rainbow appears.

"Water Pollution: A First Film". 628.168-3430 (8 min. color)
Following a single stream from its origin to its end reveals many sources of pollution. Individuals as well as groups can help clean up our water sources.

"Your Friend The Water". 614.7-0943 (6 min. color)
A forest ranger's work in conservation, lumbering, fire fighting; portrays crews and equipment in action at an actual fire.

"How Water Helps Us". 551.4-0605 (11 min.)
Water is shut off in a boy's home and he begins to realize its value.

TEXT FROM THE IEE BOOK "The A B C's of WATER"
by Marilyn Laskey.

The letter, word, and article are pictured on the front of each page. The explanations are given on the back.

Aa-air - Does air have water in it?

Yes! There are many many tiny drops of water in the air around you—so tiny you cannot see them. When they get cold they cling together, making big drops that you can see. Look at the drops on the outside of a cold glass of milk. They come from the air.

Bb-bathtub - Does this bathtub have water in it?

Yes! We use water to help keep ourselves clean. It washes away dirt and germs.

Cc-cloud - Does this cloud have water in it?

Yes! Clouds are made of many many tiny drops of water clinging together. When the drops become cold and heavy they fall to earth as raindrops.

Dd-dew - Does dew have water in it?

Yes! When invisible drops of water in warm air touch the cool ground they become visible. We call them "dew".

Ee-earth - Does the earth have water on it?

Yes! Look at a globe. The blue parts show where water is on the earth. Most of the earth is covered with water.

Ff-fire hose - Does this fire hose have water in it?

Yes! Pipes under the gound carry water to fire hydrants. Firemen attach hoses to the hydrants and use water for putting out fires.

Gg-glass - Does this glass have water in it?

Yes! Water helps to keep us healthy. We could not live long without water. We should drink much water, but first we must be sure that it is free of harmful germs.

Hh-hot dog - Does a hot dog have water in it?

Yes! Everything we eat has at least a tiny bit of water in it.

Ii-ice - Does ice have water in it?

Yes! Ice is water that has frozen and become solid.

Jj-juice - Does juice have water in it?

Yes! Everything we drink is made partly of water.

Kk-kitten - Does a kitten have water in it?

Yes! All animals are made mostly of water! Blood is mostly water.

Ll-lake - Does this lake have water in it?

Yes! Lakes can be beautiful to look at. If they are kept clean they can provide fun for us--swimming, fishing, and boating. Some lakes are used to provide water for our homes.

Mm-Mississippi River - Does the Mississippi River have water in it?

Yes! The Mississippi River is the biggest river in our contry. People travel on it and send things like wood and cotton from one place to another.

Nn-Niagara Falls - Does Niagara Falls have water in it?

Yes! Tons and tons of water pour over Niagara Falls every day. This pouring water is used to make electricity.

Oo-ocean - Does an ocean have water in it?

Yes! Most of the water on the earth is in the oceans. People fish, boat and swim in it, but they do not drink ocean water because it is too salty. Put some ocean water in the sun. The water will evaporate. The salt will not. You will see the salt that was in the water.

Pp-pool - Does this pool have water in it?

Yes! Water can be fun to swim in if it is kept clean. Water also cools us.

Qq-quart jar - Does this quart jar have water in it?

Yes! A quart is one way to measure water. We measure water in cups too. Four cups of water will fill a quart jar.

Rr-roots - Do roots have water in them?

Yes! Roots take water from the ground and send it up to the rest of the plant. The leaves make food with some of the water and let the rest go into the air.

Ss-sewer - Does a sewer have water in it?

Yes! Water is used to wash dirt and waste away in sewer pipes. This is one big cause of pollution.

Tt-trees - Do trees have water in them?

Yes! Trees need water to live. Their roots send water up to leaves. The leaves make their own food from water, air, and sunlight. Some water goes out of the leaves as vapor and rises to the sky.

Uu-umbrella - Does this umbrella have water on it?

Yes! Rain is water that falls from the clouds. Clouds are made of water vapor that is turning into rain. Water vapor comes from the water in puddles, streams, lakes and oceans that has evaporated in the heat of the sun and risen to the sky.

Vv-vapor - Does vapor have water in it?

Yes! When water is heated it becomes invisible. We say it has evaporated or turned into vapor. Put a little water in a pan. Heat it. Soon it will all disappear. It has turned to vapor.

Ww-washer - Does this washer have water in it?

Yes! We use water to wash our clothes. Water is used for cleaning many things.

Xx-xerophyte - Does a xerophyte have water in it?

Yes! Xerophytes are plants that can live in very dry ground. A cactus is a xerophyte. When a little rain does fall, the cactus fills up with water, then uses that water to live on. You could squeeze water from a cactus and drink it.

Yy-you - Do you have water in you?

Yes! Like all other animals you are made mostly of water. Your blood is mostly water. You could not live long without water.

Zz-zippy-zappy-zinglehammer - Does a zippy-zappy-zinglehammer have water in it?

Of course not, silly! There's no such thing as a zippy-zappy-zinglehammer!

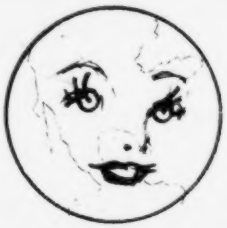
LITTLE JOHNNY RAINDROP

(A poem of the water cycle by Marilyn Laskey)

Little Johnny Raindrop
Falls down from
the sky.

①

Mother Earth
is happy.
Now her plants
won't die.



②

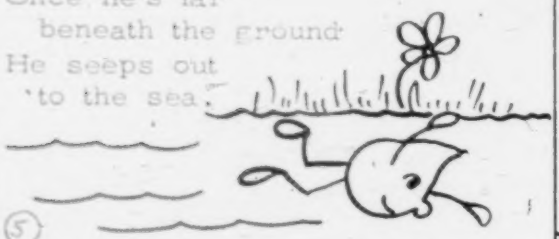
Little Johnny Raindrop
Feeds the plants
And then

③

Down he goes
into the earth,
But he'll be
back again.

④

Once he's far
beneath the ground
He seeps out
to the sea.



⑤

The sun shines down
and warms him.
The ocean sets
him free.

⑥

Invisibly,
he rises
And with others
forms a cloud.

⑦

Johnny tells
the other drops
Cheerfully,
out loud.

⑧

"We're vapor now,
but when we're cold
We'll turn again
to rain.'

⑨

"And water all
the plants below,
So they will
not complain.

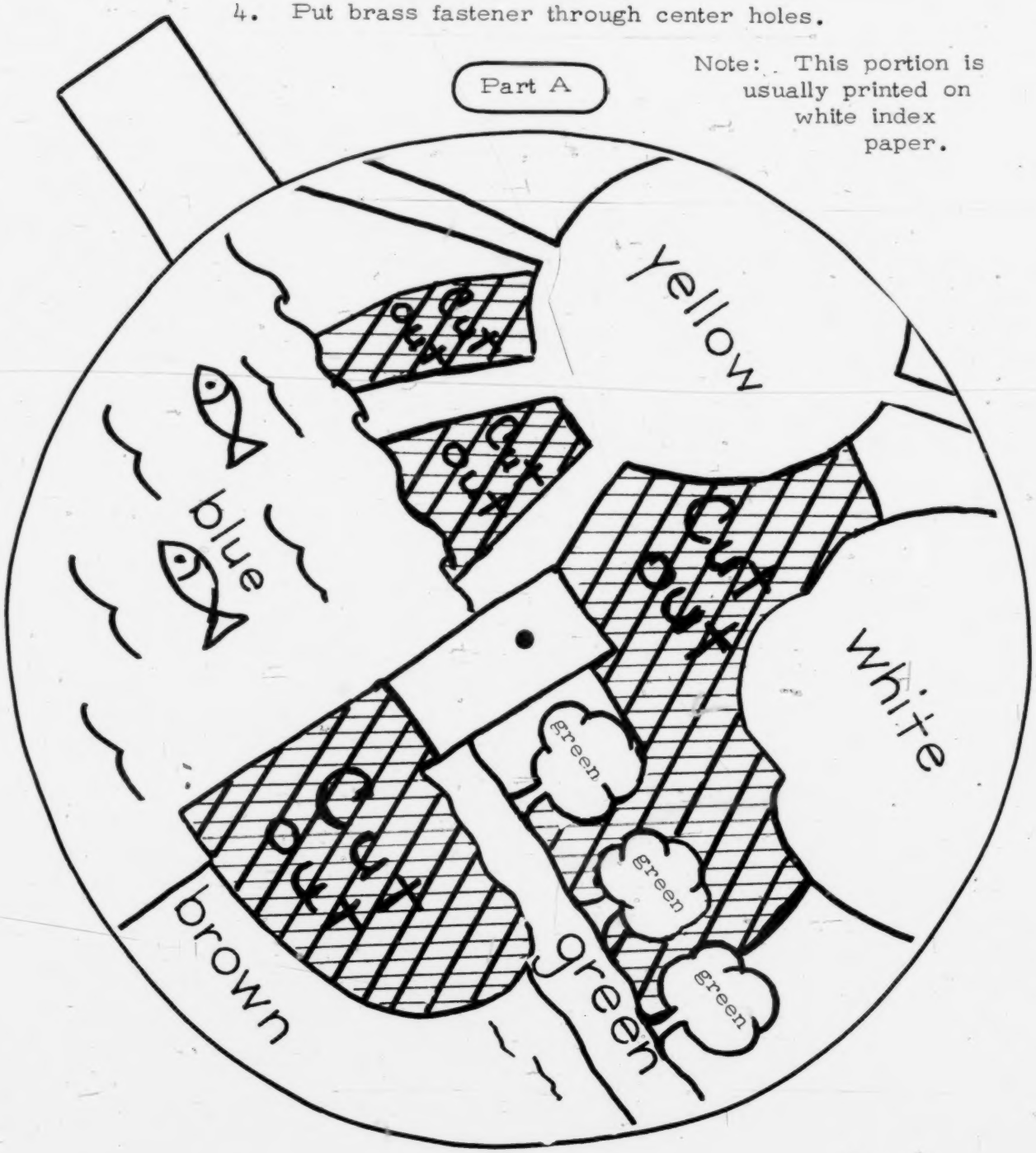
⑩

WATER CYCLE WHEEL

1. Color the areas indicated.
2. Cut out wheel. Cut out cross-hatched areas.
3. Place Part A on Part B.
4. Put brass fastener through center holes.

Part A

Note: This portion is usually printed on white index paper.

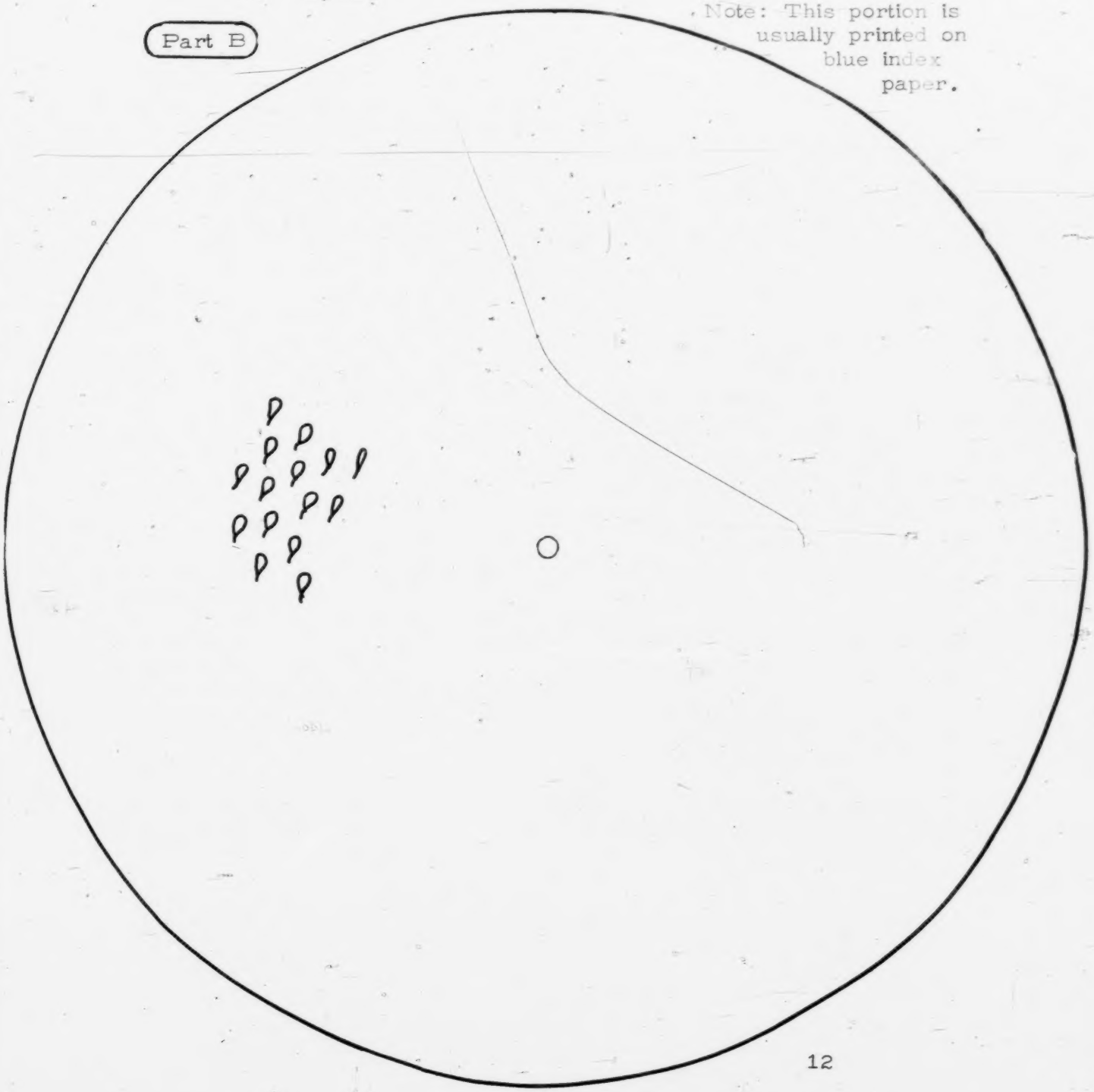


WATER CYCLE WHEEL

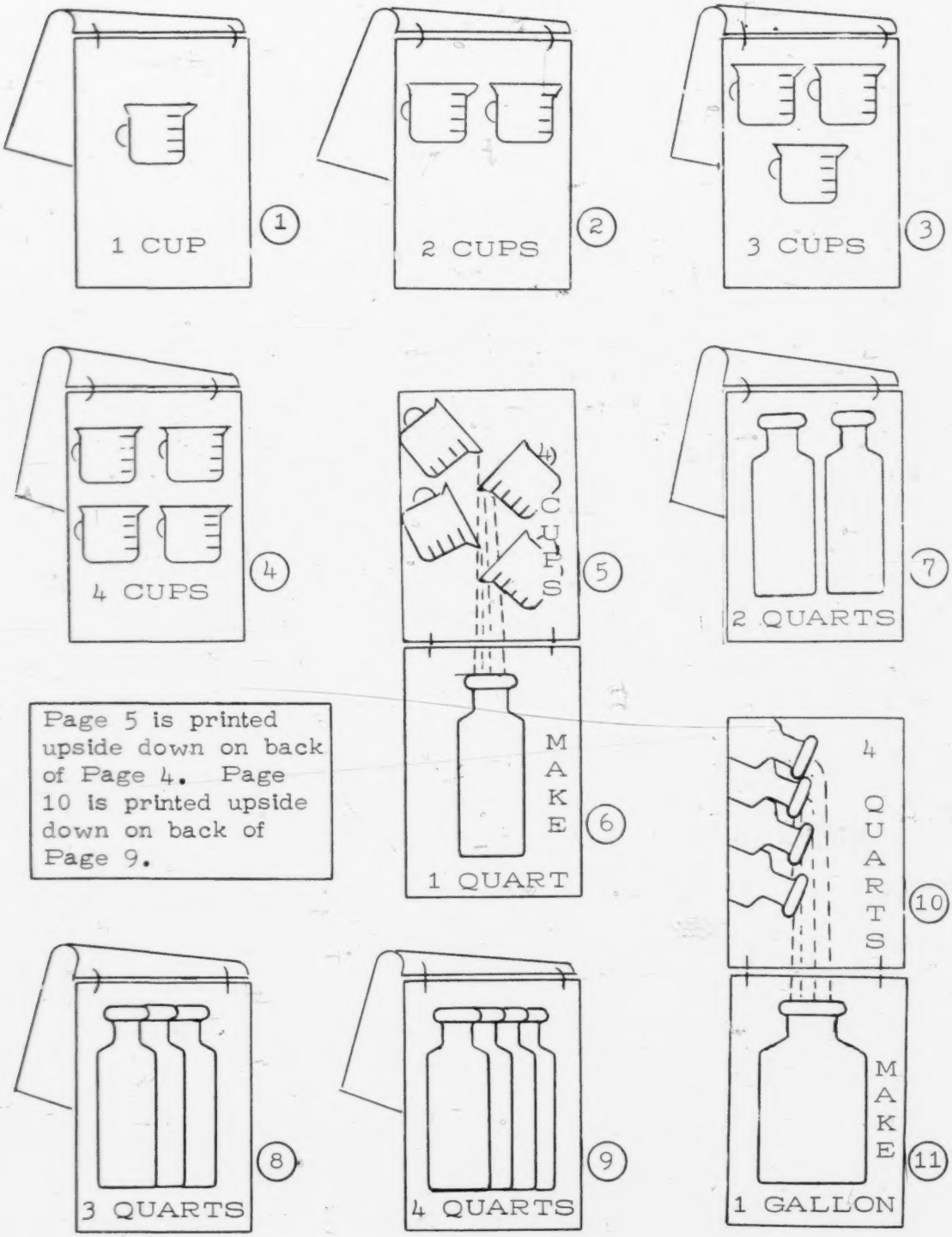
1. Cut out whole circle.
2. Place Part A on Part B.
3. Put brass fastener through center holes of both circles.
4. Holding to the handle of Part A, turn Part B slowly and watch the "raindrops" go through the water cycle.

Note: This portion is usually printed on blue index paper.

Part B



LET'S MEASURE WATER



Page 5 is printed upside down on back of Page 4. Page 10 is printed upside down on back of Page 9.

A TRIP TO THE WATER PLANT

S C R I P T

An illustrated booklet showing how water is purified at the Fiveash Water Plant in Broward County.

Page 1 - Andy and his brothers play ball in the hot Florida sun.

Page 2 - "Boy! Am I thirsty!" he says.

Page 3 - The water is cool and good. Andy asks his mother where it comes from.

"Do people catch the rain?"

Page 4 - "Most of the time we let the ground catch it for us," his mother tells him.

"The ground in Broward County is good for holding water."

Page 5 - "Pipes are put deep down into the ground. Water is pumped up through the pipes by automatic pumps."

Page 6 - "Ugh! Isn't that pretty dirty?" Curtis asks.

Page 7 - "Sometimes," says Mother. "To make sure our water is clean and pure, we have it cleaned at a treatment plant."

The boys ask to visit the plant.

Page 8 - They visit the Fiveash Water Plant, the biggest water plant in Broward County.

Page 9 - At the plant the boys find out that water comes from wells one and one-half miles away. It comes to the plant through pipes.

Page 10 - First the water is mixed with air. This takes away the odor and the gas. This is called <u>aerating</u>.

Page 11 - Then the water goes to a big round tank called the <u>hydrotreator</u>. Here <u>lime</u> and <u>chlorine</u> take out dirt and kill germs.

Page 12 - The water leaves a hard crust on the bottom of the tank. It is chipped out about once a year.

Page 13 - The boys look at the railroad car that brings the lime to the plant. Half a railroad car of lime is used each day. Lime is made of white rock ground up.

Page 14 - The water goes from the hydrotreator to these filter pools. It flows through sand and gravel where the rest of the dirt is caught.

Page 15 - The water is put into big round ranks. More chlorine is added to make sure the water is safe to drink.

Page 16 - This big tank holds five million gallons of water—more than you will use in your whole life.

Page 17 - These big pumps pump the water from the big tanks to all parts of the city.

Page 18 - It is pumped to factories, restaurants, schools, and to many of our homes where we can drink water that we are sure is clean and pure.

GLOSSARY (Explanations of difficult words)

Aerating

mixing the water with air to take away the odor and gas.

Hydrotreator

a big round tank where lime and chlorine are mixed with the water to take out dirt and kill germs. "Hydro" mean water.

Lime

substance made from ground up rock (limestone).

Chlorine

a chemical that kills germs.

OUR WATER SUPPLY

S C R I P T

A filmstrip and tape presentation showing how water is obtained and purified at the Fiveash Water Treatment Plant in Broward County, Florida.

TWO INTRODUCTORY PICTURES:

We know that the water we use in our homes and at school is pumped from the ground. We know that it is then treated at the water treatment plant to be sure it is clean and pure. Let's take a look at the largest water treatment plant in our county, the Fiveash plant in Fort Lauderdale, Florida.

PICTURE OF AERATOR:

Water is pumped from the wells through underground pipes and into this big pool where it is mixed with air. So it is called an aerator. The aerator helps take away the smells and gas.

PICTURE OF HYDROTREATOR:

Then the water goes through pipes and comes into the bottom of this huge round tank. It floats up through a sudsy-like blanket where little bits of dirt which make the water cloudy and dirty-colored are caught. The dirt falls to the bottom of the tank. The cleaner water floats on up to the top. This huge tank is called by a big name—hydrotreator. But the name is easy to remember when you know that hydro means water and, of course, this tank is a water treater.

PICTURE OF LIME CAR:

A railroad runs beside the treatment plant. Railroad cars are used to bring in some of the things used to treat the water. This big car has lime in it. Lime is the stone of which Florida is made. If you dug down deep in the ground, you would hit limestone. The stone in this car has been dug from the ground and crunched up.

PICTURE OF MILK OF LIME MACHINE:

This strange-looking contraption is a lime machine. The lime goes through a hose from the railroad car to this machine where it is mixed with water and then it looks like thick milk. It is even called milk of lime.

PICTURE OF CHLORINE TANK CAR:

This tank car is used to bring in a liquid chemical called chlorine. The chlorine is pumped from the tank car to an evaporator where it is changed from a liquid to a gas. This chlorine gas and the milk of lime, along with something called silica (a kind of sand), are all mixed together to make up the sudsy blanket in the bottom of the huge round hydrotreator.

PICTURE OF CHLORINATOR:

This is the chlorinator which measures out the chlorine that is needed by the hydrotreator. The chlorine kills germs in the water.

PICTURE OF TROUGH AND PIPES:

On the left of this picture you see green pipes, yellow pipes, and below the yellow pipes, a trough. The green pipes carry the silica to the hydrotreator, the yellow pipes carry the chlorine gas, and the trough carries the milk of lime.

PICTURE OF FILTERS:

After being treated in the hydrotreator, the water goes to these pools which are called filters. The water drips down through filters which are made of hard coal, silica sand, and gravel. Tiny bits of dirt that are still in the water get caught in the coal, silica sand, and gravel mixture. The water that comes out of the filter is clean and ready for use.

PICTURE OF BACKWASHING:

Guess what this muddy gunk is! These are the same filter pools we just saw, but the filters are being cleaned. Water is washed back up through the coal, silica sand, and gravel, and the dirt is washed away. The filter is once again clean and ready for filtering more water.

PICTURE OF CONTROLS:

These are the controls which check the filters and automatically start them backwashing when they are dirty.

PICTURE OF BIG TANK:

The clean water that comes from the filter pools is stored in gigantic tanks which can hold millions of gallons. It is then pumped to all parts of Fort Lauderdale by these big electric pumps. Do you wonder what would happen, though, if the electricity ever went off and these pumps could not work? No water to drink or wash with! No water for flushing toilets or doing the laundry!

To keep this from happening,

PICTURE OF DIESEL PUMPS:

the city has special pumps which run on diesel power. These pumps are ready for use if there is no electricity. This is a picture of the diesel-powered pumps.

PICTURE OF LABORATORY:

This is the laboratory where, every hour, men test the water that has been all through the system to make sure that it has been properly cleaned and purified.

PICTURE OF CONTROL ROOM:

This complicated-looking room is the operators' control room. These gauges automatically control the water that is pumped to all parts of the city. There is even a gauge to show if anything in the treatment system has gone wrong or is not working right.

PICTURE OF STORAGE TANK:

From the water plant the water is pumped out to storage tanks in different parts of the town. The water rushes down the pipes and into our homes and businesses.

PICTURE OF PUMP STATION:

This is the Poinciana Pump Station which supplies some of the people of Fort Lauderdale with water that they can be sure is clean and pure because of the men at the Fiveash Plant.

Now, let's go back and see how many of the steps in making water clean and pure we can remember.

PICTURE OF AERATOR:

Do you remember the name of the big pool where the water first went and was mixed with air? Good! The aerator!

PICTURE OF HYDROTREATOR:

Then the water went to this huge round tank where it flowed through the sudsy-like blanket. This treatment took dirt from the water. What is this treatment tank called? Hydrotreator!

PICTURE OF LIME CAR:

Aha! A railroad car! This is an easy one! What was in the railroad car? Right—the lime!

PICTURE OF MILK OF LIME:

And this lime machine did what to the lime? Good! Mixed it with water to make milk of lime.

PICTURE OF CHLORINE TANK CAR:

Okay, we're doing great so far! How about this tank car? Remember the liquid chemical it holds? Chlorine, of course! The same chemical some of your folks pour into your swimming pools to kill the germs.

PICTURE OF CHLORINATOR:

Say! I can't remember this one, myself. Can anyone help? Oh yes! This is the chlorinator which feeds the proper amount of chlorine to the hydrotreator.

PICTURE OF TROUGH AND PIPES:

Remember the green and yellow pipes—and the trough? What do they do? Good! They carry the milk of lime, the chlorine gas, and something called silica to the hydrotreator where they mix to form the sudsy-like blanket.

PICTURE OF FILTERS:

Hmmmmmmmm, what were these? Little swimming pools? Ooops! No! You're right! These are the filter pools which take the remaining dirt from the water.

PICTURE OF BACKWASHING:

Yuk! No doubt about what this is! The mud-pie makers should be around when the filters are backwashed.

PICTURE OF CONTROLS:

Two monster eyes? If this were a monster, what would he be watching for? Well—he'd watch to see when the filters are dirty and would automatically start them backwashing.

PICTURE OF BIG TANK:

Remember what powers these regular pumps which pump the water to all parts of the city? Good! Electricity!

PICTURE OF DIESEL PUMPS:

Now—what are these pumps? Right! The extra pumps which are diesel-powered and can be used if the electricity goes off.

PICTURE OF LABORATORY:

What do the men in this laboratory do? Of course! Check to make sure the finished water is properly cleaned and purified.

PICTURE OF CONTROL ROOM:

And this, of course, is the control room that automatically checks all parts of the system.

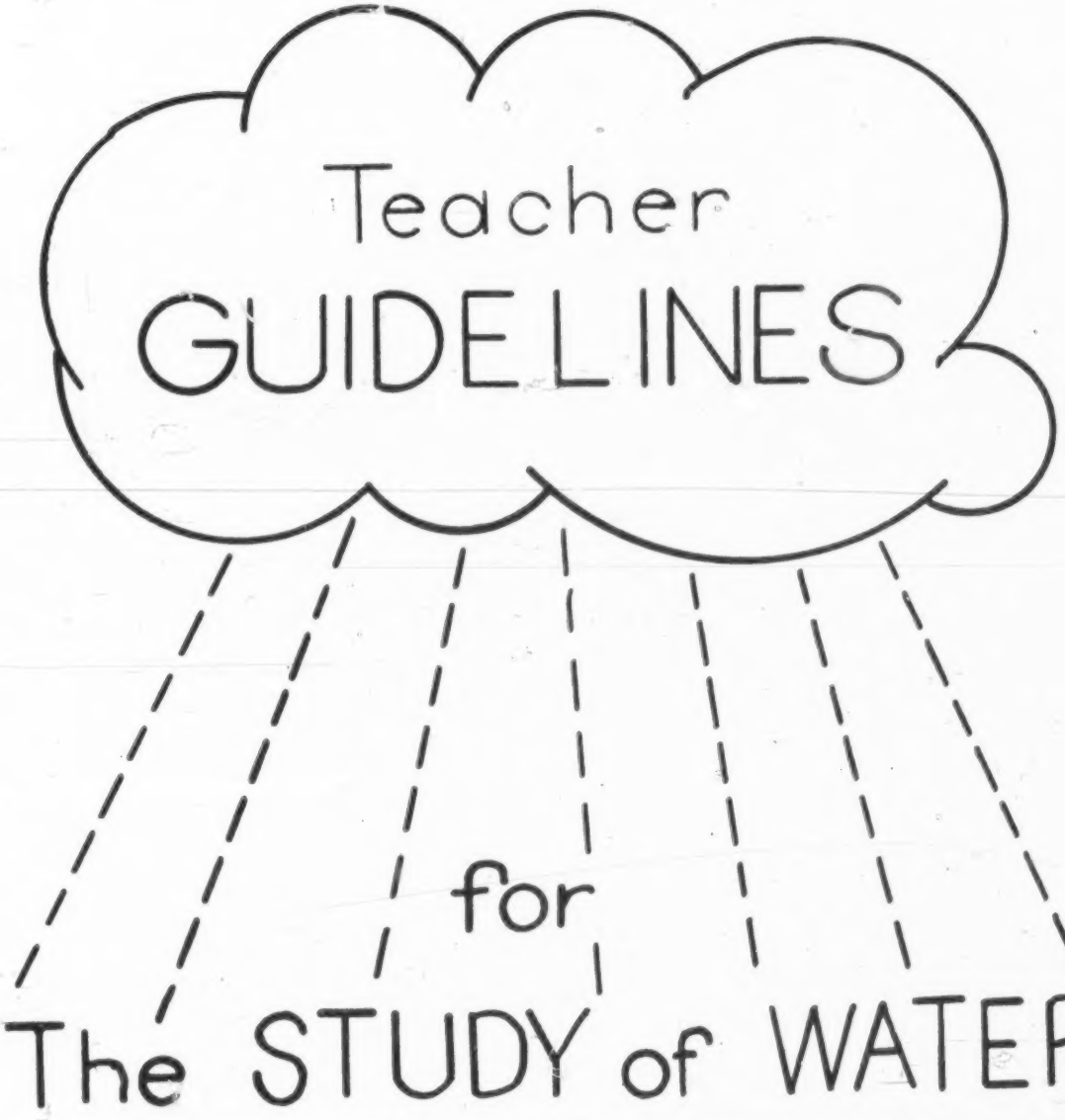
PICTURE OF STORAGE TANK:

We've all seen these high water tanks. But, do you know why the water is pumped so high? Good! When it comes rushing down from the high tank, it pushes itself through the pipes and into our homes, so we have a strong gush of water when we turn on our faucets.

PICTURE OF PUMP STATION:

Grand! Everybody makes 100 on the water plant test!

HOPE YOU'VE ENJOYED YOUR TRIP!!!!!!!!!



By Marilyn Laskey

INTERDISCIPLINARY ENVIRONMENTAL EDUCATION

AN ESEA TITLE III PROJECT
Based at Nova High School

Broward County Schools, Florida

1972

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An ESEA Title III Project

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I have reviewed this package for content in terms of curriculum and appropriateness.

John Arena
IEE Director
Date: 8/24/72

GUIDELINES

FOR

THE STUDY OF WATER

Based on concepts from Part I of Guidelines for Curriculum Development - Environmental Education K-12: Concepts, Ideas, Objectives, and Principles.

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1. All things on earth are interrelated. This is very apparent in the study of water, for all things on earth are in some way affected by water and water is in some way affected by all things on earth.

2. Water is one of the basic needs of all living things. Plants and animals must have water to live. Without water man could live only a few days.

3. Besides being used for man's personal needs such as drinking, cooking, bathing, and cleaning, water is used for irrigation in agriculture, for cooling and washing in industry, and to transport wastes. It provides man with a means of transportation and is a source of electric power. It also provides for many forms of recreation.

4. The earth is a contained unit with no input of new matter, including water. The natural cycle of basic matter has allowed life on earth to be sustained for millions of years. Water is one type of of matter which circulates endlessly in a cycle. Heat causes the evaporation of water from bodies of water on earth. Plants lose water through evapotranspiration; animals, including people; through respiration and perspiration; and machines, through combustion. This vapor eventually condenses into precipitation and falls to earth.

5. Almost four-fifths of the world is covered with water but approximately 3% of this is frozen and 97% is ocean water, too salty in its present state to be used for drinking, agriculture, or industry. Water for these purposes must come from fresh supplies underground or in lakes, rivers, and streams (only 0.6% of the earth's supply).

6. Unfortunately, the rain (or other precipitation) that falls in the water cycle does not fall in equal amounts everywhere, nor in even amounts in the same place. Therefore, there are droughts and floods. Prolonged droughts cause water crises.

7. Population growth and related technological needs, particularly in large urban areas, place large demands on the available supply, often leading to water crises.

8. Pollution is another cause of water crises.

   a. Pollution begins as the rain falls back to earth. As the rain moves down through the air, it picks up dust, soot, plant pollen, etc.

   b. Open trash and garbage dumps further pollute the rain water because bacteria, gas (caused by rotting garbage), and other possible harmful chemicals are gathered there. This rain water then either flows back into bodies of water or seeps down into the "ground water" supply.

   c. Detergents containing a high amount of phosphate contribute to water pollution. Phosphates cause the water plant algae to grow at a rapid pace. This accelerated growth and decaying process decreases oxygen, killing fish. Other plants die, as well, and the decaying matter speeds up the natural filling up of the body of water (eutrophication).

   d. Human waste sewage dumped into bodies of water causes pollution.

   e. Nitrates from farm fertilizers and insecticides or pesticides such as DDT sometimes drain into bodies of water or seep down into "ground water".

   f. Industry dumps chemicals and heated water into bodies of water. (Some companies, however, do recirculate their water.) Chemicals (including insecticides) not only are absorbed by the bodies of fish, but also by man who eats the fish. In many cases chemicals kill fish and water birds.

   g. Silt from dredging and filling pollutes water, killing water plants and animals.

   h. Litter carelessly thrown by individuals, plus the other pollutants, is not only harmful to man and water animals, but destroys the beauty of our country.

9. Natural purification of water has always been part of the water cycle, but nature cannot keep up with this excessive pollution. In most areas man must use artificial means (such as filtration and chlorination) to purify the water supply.

10. Limiting population growth in critical areas, making concerted efforts to eliminate pollution, and making concerted efforts to conserve water can help to alleviate crises.

11. Attempts are being made to obtain more usable water. Examples are the treatment and reuse of sewage water and the desalination of sea water, both comparatively expensive.

12. Trying to find more usable water is of worldwide concern. A ten-year program of research was begun in 1966 by hydrologists from all over the world. It is called IHD (International Hydrological Decade).

13. The Water Quality Act of 1965 and the Clean Water Restoration Act of 1966 mark the beginning of action by our federal government to fight water pollution. State and local governments are also taking similar steps.

14. Most of the water used in Broward County is rain water which seeps through the ground and is caught between layers of porous limestone. This excellent storage area is known as the Biscayne Aquifer. Water is pumped from the aquifer and chemically treated in various treatment plants in the county.

15. Demands of the rapidly growing population of South Florida (10% per year growth in Broward; less than 1%, nationwide), coupled with the digging of canals (which allows additional evaporation, runoff to the sea, and salt water intrusion into the fresh supply), have created a water crisis in South Florida. Because of this crisis, Governor Reubin Askew, in 1971, called a Conference on Water Management in South Florida. The recommendations following that conference called for immediate development of an enforceable comprehensive land and water use plan which would result in a water budget system that would ultimately serve as a limitation on allowable population increases.

16. As an outgrowth of the governor's conference, the 1972 Florida Legislature passed a number of environmental bills. Among these are the Florida Environmental Land And Water Management Act of 1972 and the Florida Water Resources Act of 1972.

17. Individuals can help to have clean, healthful, available water by conserving it; by doing their part to keep open bodies of water clean; by learning about local problems; by joining local environmental groups; and by supporting legislators and legislative acts dealing positively with these problems (writing letters, attending meetings.....and voting).

WATER STUDY ACTIVITIES

For Primary Youngsters

A Teacher's Handbook

Interdisciplinary Environmental Education
An ESEA Title III Project
Nova High School
Broward County Schools, Florida
1972

WATER STUDY ACTIVITIES

FOR PRIMARY YOUNGSTERS

Based on the IEE booklet

THE A B C's of WATER

SUGGESTIONS

Introduce one alphabet letter and related concept at a time.
Discuss the questions before reading the answers.
Reinforce or supplement each concept with at least one activity.
Have the pupils duplicate each alphabet page as they study it, creating a book of their own.

RELATE MATERIALS AND ACTIVITIES FROM ALL SUBJECT AREAS

TEXT BOOKS IN ALL SUBJECTS

LIBRARY MATERIALS

books magazines filmstrips transparencies pictures records

COUNTY FILMS

MATHEMATICS

Design problems around environmental content.

LANGUAGE ARTS

Base an individualized reading program on related books and texts.

Write daily chart stories or individual stories with illustrations.

Keep a cumulative vocabulary list to familiarize the pupils with new words, help them with their spelling, and guide them in their story writing.

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Date: 8/24/72

A a (AIR)

Q: Does air have water in it?

A: Yes! There are many, many tiny drops of water in the air around you.....so tiny you cannot see them. When they get cold they cling together, making big drops that you can see. Look at the drops of water on the outside of a cold glass of milk. They come from the air.

Related Activities:

Fill glasses with cold liquid. Let the children examine and discuss what happens to the outside of the glasses. Explain condensation.

Show county film, "Water, Water, Everywhere", 551.4-611. (Children learn of the water cycle through Jimmy's observations. Excellent for young.)

Read IEE book, "Little Johnny Raindrop". Discuss the time the drops are invisible (vapor). Begin an individual or wall chart cumulative dictionary with this word and any others appropriate. Illustrate dictionary words.

Demonstrate a water cycle wheel. Let the children construct wheels and review them.

B b (BATHTUB)

Q: Does this bathtub have water in it?

A: Yes! We use water to help keep ourselves clean. It washes away dirt and germs.

Related Activities:

Read a book about cleanliness and health—or use a portion of your health book.

Show county film, "Good Health Practices", Part 1, 613-1888. (10 min., color.)

Sing and go through motions of "This is the way we wash our hands" (face, arms, etc.) to the tune of "Mulberry Bush".

Read the IEE book, "Let's Measure Water". Demonstrate with cup, quart, and gallon containers.

Have a child wash his hands in running water. Save the water. Have the children estimate how much water it took. Measure the water. Encourage the children to measure amounts they use at home.

Discuss the need for conserving water. Have children suggest ways in which it can be conserved.

Set up facilities for water play in the classroom. Have liquid measuring equipment available.

C c (CLOUD)

Q: Does this cloud have water in it?

A: Yes! Clouds are made of many many tiny drops of water clinging together. When the drops become cold and heavy they fall to earth as raindrops.

Related Activities:

Review "Little Johnny Raindrop" and the water cycle wheels.

Take a walk outside to observe the clouds. Try to find pictures in the clouds. Draw cloud pictures.

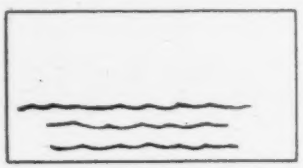
Talk about the different types of clouds you would see on different days. (Consult a child's weather book, encyclopedia, or write U.S. Weather Bureau, Washington, D.C., for book and chart.) Make different types of clouds out of construction paper or cotton. Mount them on blue or gray construction paper and label them with words or sentences such as "Thunderhead" or "Dry Day Ahead".

Begin keeping a weather calendar (or individual calendars). Each day draw the type of day (clouds, sun, etc.) on your calendar. At the end of the month count or tally each type of day. Consider which type of day there were the "most" of, etc. Make up various addition and subtraction problems. Use fractions, if appropriate.

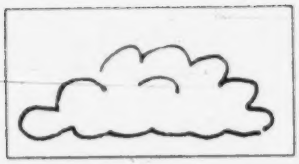
Play a relaxing classical record (such as Debussy's "Clair de Lune" or portions of Chopin's "Nocture in E Flat Major). Have the children close their eyes and relax, imagining they are floating clouds.

Let the children copy and illustrate the following poem:

STRATUS clouds
Are low and flat,
They might bring a shower!

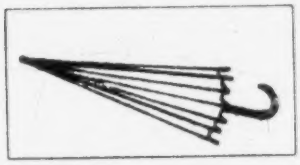


CUMULUS clouds,
Those fluffy heaps,
Might storm down by the hour.



CIRRUS clouds
Are way up high.
Whispy, thin white "fellas".

When they're the only
Clouds in sight,
Then leave home your umbrellas.



by M. Laskey

Read the poem, "Clouds", by Christina Rossetti (Arbuthnot, Book I, p. 156)*

Talk about fog being a cloud on the ground. Read "Fog' by Carl Sandburg (Arbuthnot, Book I, p. 161).

D d (DEW)

Q: Does dew have water in it?

A: Yes! When invisible drops of water in warm air touch the cool ground they become visible. We call them "dew".

Related Activities:

Go walking on the school grounds in the morning. Observe the dew on the ground. Go out again in the afternoon. Discuss why there is no dew.

Discuss the spelling of the word "dew". Ask if the children know of another word which sounds exactly like dew but is spelled differently. (Do) Explain "homonyms". As a class or individually

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*All poems referred to in this guide are in The Arbuthnot Anthology of Children's Literature by May Hill Arbuthnot. Scott Foresman and Company, Glenview, Illinois. 1961.

have the children make lists of homonyms and their meanings. (Use dictionaries and books.) Teacher may give clues, if necessary.

Talk about the various forms of precipitation; then give the children copies of the following "guessing poem" to fill in (or have them copy it from the board).

Get the umbrella, Mary Jane,
And we'll go walking in the _____. (rain)

Balls of ice fall in a gale.
These tiny balls are known as _____. (hail)

Cold white flakes against you blow.
These lovely flakes are known as _____. (snow)

Drops of water on my shoe
From morning grass—we call it _____. (dew)

Frozen rain blows swift and fleet;
This stinging rain is known as _____. (sleet)

E • (EARTH)

Q: Does the earth have water on it?

A: Yes! Look at a globe. The blue parts show where water is on the earth. Most of the earth is covered with water.

Related Activities:

Use globes and maps to teach the children how to recognize bodies of water. Consider how much of the surface of the world is water (using percentages or fractions, if appropriate). Approximately 70% or 3/4.

Have the children make their own maps or globes of the world from papier-mache', clay or styrofoam balls. (Opaque or overhead projectors can be used for map duplication.) Or, give elementary maps to the children to be colored and labeled.

Use Florida maps and local maps to familiarize the children with bodies of water in this area. (Atlantic Ocean, Gulf of Mexico, Lake Okeechobee, New River.) Impress, particularly, upon them the fact that we are on the Atlantic Ocean.

Read the poem, "At The Seaside", by Robert Louis Stevenson (from A Child's Garden of Verses). (Arbuthnot Book I, p 103)

Review the water cycle wheel. Talk about the fact that sometimes more rain falls in certain places than at other times, creating droughts and floods. Relate this to what they have observed in South Florida.

Consider the most famous flood of all. Read Noah's Ark or tell the story. Related activities could include a short unit on animals: playing of records such as "The Unicorn"; Bill Cosby's "Ark" routine; or dramatization of the story with animal masks. The symbolic importance of the rainbow can be pointed out, accompanied by a related science unit on the spectrum. Learn the song, "I Can Sing A Rainbow". Read "The Rainbow" by Walter de la Mare (Arbuthnot, p. 162) and "My Heart Leaps Up" by William Wordsworth (Arbuthnot, p. 162).

Talk about plant and animal life adapted to living in water. Show county film, "Life in An Aquarium", F 591.9-0811 (11 minutes), which explains how fish swim and breathe.

Make a crayon drawing of underwater life. Wash over it with blue water color. (Paper may be shaped like a fish bowl or aquarium.)

F ! (FIRE HOSE)

Q: Does this fire hose have water in it?

A: Yes! Pipes under the ground carry water to fire hydrants. Firemen attach hoses to the hydrants and use water for putting out fires.

Related Activities:

Read a book about firemen.

Show the county films:

"Fire Prevention—Donald's Fire Survival Plan", F 614.84 (11 min., color, Walt Disney)

"Fire", F 614.843-2632 (15 min., color). A rookie fire fighter learns about the equipment in the fire house; then goes to a real fire.

"I'm No Fool With Fire", F 614.84 (8 min., color, Walt Disney). Shows the right and wrong ways to use fire.

"Fireman", F 614.84-0962 (10 min.) Shows how firemen work—go to a real fire.

Take a field trip to a nearby fire department, if allowable.

Have a fireman visit your classroom or have a fire engine brought to your school. (Consult your principal. Sometimes this is standard for Fire Prevention Week.)

Write chart stories or individual stories about fire. Illustrate.

Learn to sing the round, "Scotland's Burning".

G g (GLASS)

Q: Does this glass have water in it?

A: Yes! Water helps to keep us healthy. We could not live long without water. We should drink much water, but first we must be sure that it is free of harmful germs.

Related Activities:

Have the children count the drinks of liquid they have during a day. Make up math problems based on their reports.

Review (or introduce) "Let's Measure Water". Measure out the amounts the children drank during the day.

Stress the importance of drinking liquids. Show county film, "The Water We Drink", 613-0933 (11 min.). Tells why water is essential to our bodies; why we should drink only clean, pure water; and shows methods of water purification.

Read the IEE book, "A Trip To The Water Plant". Show the IEE filmstrip, "Our Water Supply".

Take a field trip to a local water plant. Follow up with stories and illustrations.

Play the Western recording, "Water". Let the children sing the refrain.

H h (HOT DOG)

Q: Does a hot dog have water in it?

A: Yes! Everything we eat has at least a tiny bit of water in it.

Related Activities:

Have a hot dog roast and watch the liquid ooze out as the hot dogs cook (emphasize safety precautions) or cut small pieces of hot dogs and let the children squeeze and observe them.

Cut a cucumber or potato into thin slices. Weigh them on a small scale and record the weight. Put them near a sunny window to dry. Weigh them again when they are dry. Make up a number of math problems related to these weights. Let the children estimate the weights of various articles; then weigh them.

Grate carrots. Squeeze the gratings in cheese cloth. The children will be amazed at the amount of liquid in the carrots.

Make raisins. (Send for U.S. Department of Agriculture Science Study Aid No. 1, "Making Raisins", for sale by Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402. 10¢)

I i (ICE)

Q: Does ice have water in it?

A: Yes! Ice is water that has frozen and become solid.

Related Activities:

Give each child two ice cubes; one to hold in his mouth, one in a container. Which melts faster? Why? (Heat)

Have the children hold the other cube to their skin or in their hand. How does their skin feel after a minute or so? (Numb) Discuss the value of ice in First Aid. Discuss other values such as food preservation, recreation, and air conditioning.

Consult a science book for information and experiments on freezing water. Include temperature studies and expansion and contraction.

Play "Skater's Waltz" and let the children pantomime ice skating.

Read the poem, "Ice", by Dorothy Aldis (Arbuthnot, Book I, p. 179)

J j (JUICE)

Q: Does juice have water in it?

A: Yes! Everything we drink is made partly of water.

Related Activities:

List various types of juices. Have the children draw the original food from which the juices came.

Let the children squeeze orange juice in class. Let them measure the amounts they squeeze. (Review "Let's Measure Water") How many oranges does it take to make a cup of juice? Make up various math problems.

Do a health study on a balanced diet. Let the children design balanced meals from pictures cut from magazines.

Show county films:

"You and Your Food", 641.1-2058 (8 min.. color). Shows value of food and well balanced diet. Walt Disney.

"Food For Fun", 641-2402 (10 min. color). Young fisherman uses a miniature "Dagwood" sandwich as bait. Shows wholesome eating habits.

Prepare a balanced meal at school. Let the children plan it by figuring the cost, collecting the money, doing the purchasing and helping to prepare it. Use volunteer parent help.

Have the children bring in fruits and vegetables and make characters and animals from them.

K k (KITTEN)

Q: Does a kitten have water in it?

A: Yes! All animals are made mostly of water! Blood is mostly water.

Related Activities:

All animals with backbones have some kind of blood. Blood serves to deliver food throughout the body and to carry away wastes. A 160 pound person has about 5 quarts of blood in him. An 80 pound person has about 2-1/2 quarts. (Guide the students to discover this is an ounce of blood per pound.) Introduce ounce measurement. Weigh the children and let them figure how much blood is in them.

Besides containing water in the form of blood, animals also require water to live, just as human animals do. Some need a great deal (aquatic animals and amphibians) and some can live on very little (desert animals). Consult your science book for information and activities dealing with these animals or read children's books about them. Emphasize adaptations.

L 1 (LAKE)

Q: Does this lake have water in it?

A: Yes! Lakes can be beautiful to look at. If they are kept clean, they provide fun for us—swimming, fishing, and boating. Some lakes are used to provide water for our homes.

Related Activities:

Display a map of Broward County. Point out that there are lakes, rivers, canals, and an ocean. How are these bodies of water different? (If pupils are capable, have them look up the words in the dictionary or encyclopedia; otherwise, have a guided discussion. Talk about lakes, rivers, and canals on which the children live. What types of activities take place on these lakes? (Pupils may pantomime and let the others guess.) Do people generally swim there? (Probably not.) Why not? (Most lakes, canals, and rivers in the county are too polluted for safe swimming—also, boating activities make it dangerous.) Why shouldn't a person swim in polluted waters? (They may get a disease—even a fatal disease.) How does the water become polluted? (Refer to Concepts.) How can we keep the water from being polluted? What can we do personally to keep the water from being polluted? (With young children stress keeping the water clean by refraining from littering, dumping trash and garbage, and using phosphate cleaning products.)

Draw, paint, or cut pictures from magazines of various recreational and aesthetic uses of water.

Visit a nearby body of water and identify sources of pollution. (Take enough chaperones!)

Make a mural of clean and dirty recreational waters.

Order a 23" x 44" picture Conservation Chart and accompanying 15 page text from Sport Fishing Institute and Wildlife Management Institute, 719 Thirteenth Street, N.W., Washington, D.C. 20005. (Contrasts two valleys; one polluted, one well cared for. A widely acclaimed method of teaching conservation to grade school children.)

M m (MISSISSIPPI RIVER)

Q: Does the Mississippi River have water in it?

A: Yes! The Mississippi River is the biggest river in our country. People travel on it and send things like wood and cotton from one place to another.

Related Activities:

Locate the Mississippi River on a map of the United States. Identify the states along the Mississippi. Talk about the transportational value. Read about it from the encyclopedia or a library book.

Read excerpts from books dealing with the Mississippi, perhaps, Tom Sawyer or Huckleberry Finn.

Play "Ole Man River" and other numbers from "Show Boat".

Have the children make maps or color and label simple maps of the United States, showing the Mississippi River. Along with these, let them illustrate various goods which are transported on the Mississippi.

Do a study of New River and its importance in the establishment of Broward County. (References: Watchie-Esta/Hutrie - The Little White Mother by August Burghard. A story of Broward County's first school teacher. Published by The Historical Society of Fort Lauderdale, Inc. Checkered Sunshine, The Story of Fort Lauderdale by Weidling and Burghard. Published by the University of Florida Press, Gainesville, 1966)

Have the children write to the Historical Society of Fort Lauderdale, requesting information on New River or asking for a guest speaker. (Holiday Park Circle, Fort Lauderdale)

Read the Indian Legend of New River. Have the children dramatize the legend. Consider the geologic foundation of Florida which might account for such an incident.

Take a trip to New River. Compare how it looks today with how it looked when the early settlers were here. Incorporate art work (including models) and dramatizations.

N n (NIAGARA FALLS)

Q: Does Niagara Falls have water in it?

A: Yes! Tons and tons of water pour over Niagara Falls every day. This pouring water is used to make electricity.

Related Activities:

Discuss falls: What causes them; how they change the land beneath them; the beauty of them.

Read a children's book on electric power or consult your science book.

Let the children illustrate the many ways in which they use electric power. Have them suggest ways to conserve on power. Emphasize importance of power conservation.

Show county film:

"Electricity: Wires In Your Home", F 537-2293 (11 min., color). A study of wires in the home, power poles to the generator station, and explanation of how the generator works.

Discuss the term "tons" as a measurement.

Read or tell the children about some of the wild exhibitions that have taken place at Niagara Falls (Going over in a barrel.)

O o (OCEAN)

Q: Does an ocean have water in it?

A: Yes! Most of the water on the earth is in the oceans. People fish, boat, and swim in it; but they do not drink ocean water because it is too salty. Put some ocean water in the sun. The water will evaporate. The salt will not. You will see the salt that was in the water.

Related Activities:

Perform the above investigation.

Study the value of the ocean through various media.

Show county films:

"The Ocean: A First Film", 551.46-1819 (11 min. color). Shows the importance of oceans; their affect on weather and climate; and their influence on all living things.

"We Explore The Beach", 574 (10 min.)

Do a short unit on ocean transportation and take a field trip to Port Everglades.

Do a short unit on the beach and take a field trip to the beach. (Dania Beach in South Broward and Boynton Inlet in North Broward are suggested.)

P p (POOL)

Q: Does this pool have water in it?

A: Yes! Water can be fun to swim in if it is kept clean. Water also cools us.

Related Activities:

If you are brave, have permission from the principal and plenty of assistance, have a class pool party. Stress safety rules!

Measure air temperature; then have children touch water and guess whether it is warmer, colder, or about the same as the air. They will probably guess the water to be much colder. Measure water temperature. You will probably be surprised at how warm it is. Because of certain properties (conduction, evaporation) water feels cooler to the touch than it really is.

Have an adult who maintains his own pool (a parent, if possible) talk to the children about the importance of keeping the pool water pure; demonstrate the equipment used to check the water; and tell about the materials added to the water. Filtering and recycling can be emphasized.

Q q (QUART JAR)

Q: Does this quart jar have water in it?

A: Yes! A quart is one way to measure water. We measure water in cups, too. Four cups of water will fill a quart jar.

Related Activities:

Review or read again the IEE book, "Let's Measure Water". Let the children make their own books.

Make a collection of various types and shapes of quart containers.

Cut pictures from magazines or illustrate liquids that are measured in cups, quarts, and gallons.

Make a pitcher of ade. Quiz each child on one phase of cup, quart, and gallon measurement illustrated in the measuring book. If he answers the question correctly , pour a cup of ade for him. If not, skip him and go back after all the other members of the class have had a turn. (With all the repetition he should get it right!)

R r (ROOTS)

Q: Do roots have water in them?

A: Yes! Roots take water from the ground and send it up to the rest of the plant. The leaves make food with some of the water and let the rest go into the air.

Related Activities:

To demonstrate the ability of a plant to conduct liquid, put a stalk of celery into a container filled with colored water. Soon the stain can be seen in the veins and up to the leaves.

Take the class for a walk in a field or woods. Let each child dig up a weed. (Take implements) Later tape the weeds to construction paper. Make verbal observations concerning the pulling of the weed, the looks, feel, and smell of the roots. Through guided discussion bring out the value of roots for holding soil in place, keeping moisture in the soil, holding plants in place and bringing moisture (and other earth nutrients) to the plant.

Read a book on roots or plants.

Show county films:

"Let's Watch Plants Grow", 581 (11 min.)
Miss Nelson's class plants seeds and watches them grow.

"How Plants Help Us", 581.6-0737.

S s (SEWER)

Q: Does a sewer have water in it?

A: Yes! Water is used to wash dirt and waste away in sewer pipes. This is one big cause of pollution.

Related Activities:

Ask the children if they know what happens to waste water that leaves their homes. Draw a diagram of pipes from home to sewage plant to canal or ocean.

Grow algae in water. Pour chlorine on it and watch what happens.

Make a list of the suggestions children make when asked what things are put down the drains of their homes. Circle the ones they believe to be harmful—poisons, including insect and plant poisons; colored tissues; filtered cigarettes (the plastic in the filters kills oc an animals); medicines; and phosphates.

Have the children illustrate and label the harmful substances and give the lists to their parents.

Discuss storm sewers and runoff sources of pollution and water shortages. Explain the role of plants in preventing runoff. Contact the Division of Forestry, Florida Department of Agriculture, 6531 State Road 84, Fort Lauderdale, Florida 33314. They have materials available and you can even request a visit from Smokey, the Bear!!

T t (TREES)

Q: Do trees have water in them?

A: Yes! Trees need water to live. Their roots send water up to their leaves. The leaves make their own food from water, air, and sunlight. Some water goes out of the leaves as vapor and rises to the sky.

Related Activities:

Review the IEE book, "Little Johnny Raindrop", and the water cycle wheel.

Read a children's book on photosynthesis or do a unit from your science text.

Tie a "baggie" over a plant. Ask the class what they think will be kept in by the baggie. Drops of water should appear on the inside of the baggie (the vapor given off). This process is known as "transpiration" or "evapotranspiration".

Use the words "transpiration" and "evapotranspiration" to initiate a discussion on syllables. The children will enjoy the challenge of learning such big words. (Are you still adding words to your dictionary?)

Have the children make pictorial diagrams of photosynthesis and label them.

Make a bulletin board with a tree in the middle, rain coming down on it, and its roots soaking up rain from the earth. Around the tree put pictures of the many products we get from trees.

U u (UMBRELLA)

Q: Does this umbrella have water on it?

A: Yes! Rain is water that falls from the clouds. Clouds are made of water vapor that is turning into rain. Water vapor comes from the water in puddles, streams, lakes and oceans which has evaporated in the heat of the sun and risen to the sky.

Related Activities:

Do a health unit on proper dress.

Show county film:

"Choosing Clothes for Health", 646-1100 (10 min.)

Read the following poems:

"Who Likes the Rain?" by Clara Doty Bates.

"Spring Rain" by Marchette Chute.

"The Reason" by Dorothy Aldis.

"All Around The Town" by Phyllis McGinley.

(All the above poems to be found on p. 157, Arbuthnot, Book I.)

"The Umbrella Brigade" by Laura E. Richards.

(Arbuthnot, Book I, p. 158)

Give the children the words to the chorus and practice choral reading.

"Happiness" by A.A. Milne.

(Arbuthnot, Book I, p. 105)

"The Elf and The Doormouse" by Oliver Herford.

(Arbuthnot, Book I, p. 143)

List the clothing words in these poems and discuss what they are. (Boots, mackintosh, rubbers, slicker, galoshes, hoods, umbrellas.) What have the children heard of? Why aren't some of these articles used in Florida? (Too warm here.) If you have no boots, what is best to wear in the rain? (Barefeet—if safe, rubber shoes such as tennis shoes which will not get ruined.) Even in Florida, children should change wet shoes and wet clothing as soon as possible!

Emphasize the importance and beauty of rain. Read the following poems:

"It is Raining" by Lucy Sprague Mitchell. (Arbuthnot, p. 160).

Have the children draw themselves in the place they would like most to be when it rains. Have them write or tell about it.

"Little Rain" by Elizabeth Madox Roberts. (Arbuthnot, p. 159)

"City Rain" by Rachel Field. (Arbuthnot, p. 159)

Talk about the way these authors and Lucy Mitchell felt about rain.

Perhaps the children will be ready to compose their own poems about rain in rhyme or blank verse—either individually or as a class.

Emphasize the use of the senses. Discuss how rainy days look, sound, feel, and how they make you feel inside. Make a tape on a rainy day. Evoke feelings with the help of poetry:

"April Rain Song" by Langston Hughes. (Arbuthnot, p. 160)

If appropriate, you might introduce the class to this famous black author.

"Rain" by Ella Young. (Arbuthnot, p. 160)

"Rain Riders" by Clinton Scollard.

"In Time of Silver Rain" by Langston Hughes.

"The Rain" by William Henry Davies.

(Above three, Arbuthnot, p. 161)

"Spring Rain" by Harry Behn. (Arbuthnot, p. 159)

"Rain In The Night" by Amelia Josephine Burr. (Arbuthnot, p. 158)

V v (VAPOR)

Q: Does vapor have water in it?

A: Yes! When water is heated it becomes invisible. We say that it has evaporated or turned into vapor. Put a little water in a pan. Heat it. Soon it will all disappear. It has turned to vapor.

Related Activities:

Perform the above experiment. Extend this experiment, if you wish, by holding a freezing cookie sheet above the steam. The water will gather, condense, and rain upon the children below.

Consult your science book for further information and experiments.

Review water cycle wheel and "Little Johnny Raindrop".

Make a bulletin board of the water cycle.

Write about and illustrate the above experiment.

W w (WASHER)

Q: Does this washer have water in it?

A: Yes! We use water to wash our clothes. Water is used for cleaning many things.

Related Activities:

Diagram for your class what happens when phosphates enter bodies of water. (See Water Concepts.)

(Prepare for this ahead of time!) Have the children bring in empty detergent containers. Let them list the names of each on a chart tablet graph. Have them read the boxes and discover what percentage of phosphate is in each. Show the percentages on the graph tablet. Determine the most harmful and the most harmless. Write a report to the parents.

X x (XEROPHYTES)

Q: Does a xerophyte have water in it?

A: Yes! Xerophytes are plants that can live in very dry ground. A cactus is an xerophyte. When a little rain does fall, the cactus fills up with water; then uses that water to live. You could squeeze water from a cactus and drink it.

Related Activities:

Bring cactuses (cacti) to the classroom. Have the children observe and draw them. (Point out the protective mechanism and warn the children.)

Read a book about deserts or desert plants and their special adaptations. (Cactuses swell up as much as 90%, storing water in their pulpy stems. The root systems are just below the surface and are widespread to capture as much rain as possible. The leaves degenerate into spikes which do not transpire as other leaves do.)

Show how, although Florida is not a desert, desert plants can

thrive here. Put some local sand in a jar with gravel beneath it. The water sinks immediately through the sand to the gravel below, leaving the sand to dry quickly.

Y y (YOU)

Q: Do you have water in you?

A: Yes! Like all other animals you are made mostly of water. Your blood is mostly water. You could not live long without water.

Related Activities:

Teach the children about their own blood system—the vessels, heart, and lungs. A good book to read in whole, or part (pp. 30-42), is The True Book of Your Body and You by Alice Hinshaw. Published by Children's Press, Inc.

Show county film:

"Our Wonderful Body: The Heart and Its Work", 612-2086 (11 min., color) Step-by-step construction of a simple circulatory system: how the heart pumps, what blood and blood vessels do.

Divide children into small groups. Outline one child in each group on a large piece of paper. Let the children draw the blood system.

Z z (ZIPPY ZAPPY ZINGLEHAMMER)

Let the children draw their own version of what the mythical zippy might look like. Have them write a scary story about their mythical creature. Dramatize the best stories.

Read Where The Wild Things Are by Maurice Sendak. Allow the children to snarl and act like the wild things as you read.

H A V E F U N ! ! ! ! !